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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,889	03/01/2004	Mary Morabito O'Neill	03W124	2628
7590	12/04/2006		EXAMINER	
Raytheon Company Intellectual Property & Licensing, EO/E04/N119 2000 East El Segundo Boulevard P. O. Box 902 El Segundo, CA 90245			WYATT, KEVIN S	
			ART UNIT	PAPER NUMBER
			2878	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/790,889	O'NEILL ET AL.
	Examiner Kevin Wyatt	Art Unit 2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 September 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-21 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-5, 11-15 and 17-21 is/are rejected.
- 7) Claim(s) 6-10 and 16 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

DETAILED ACTION

1. This Office Action is in response to the Amendment after non-final, and remarks filed on 09/01/2006. Currently, claims 1-21 are pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 17-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Hou (U.S. Patent No. 6,596,979 B2).

Regarding claim 17, Hou shows in Figs. 2A-2B, 3 and 10, a method for locating a position of a feature in a scene, comprising the steps of forming an image of the feature using a segmented array having a plurality of array subelements, wherein each of the array subelements has an output signal (col. 5, lines 27-35); and cooperatively analyzing the output signals from at least two spatially adjacent array subelements to establish a data set reflective of an extent to which output signals responsive to the image of the feature are produced from exactly one or from more than one of the adjacent array subelements (col. 5, lines 48-57), and to reach a conclusion from the data set as to a location of the image of the feature on the segmented array (col. 5, lines 57-60).

Regarding claim 18, Hou shows in Fig. 10 a method wherein the step of

providing a sensor includes the step of providing a one-dimensional segmented array having spatially overlapping array subelements.

Regarding claim 19, Hou shows in Fig. 10 a method wherein the step of providing a sensor includes the step of providing a two-dimensional segmented array formed of a pattern of intersecting array subelements.

Regarding claim 20, Hou further shows in Figs. 9A-9B, a method wherein the step of providing a sensor includes the step of providing a two-dimensional segmented array formed of a pattern of square array subelements, wherein four of the square array subelements meet at an intersection point (col. 9, lines 21-24), and wherein the step of forming an image includes the step of forming the image having a diameter of one blur diameter.

Regarding claim 21, Hou further shows in Fig. 10, that each detector subelement overlaps each of two adjacent detector subelements along their lengths by an amount that is responsive to the blur diameter.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hou (U.S. Patent No. 6,596,979 B2) in view of Coufal (Publication No. U.S. 2003/0053221 A1).

Regarding claim 1, Hou shows in Figs. 2-3 and 10, an imaging sensor system comprising an optics system that images a point feature (960, 968 and 970, i.e. scanning dots) of a scene at an image plane; and a detector array (950, i.e. image sensor) at the image plane, wherein the detector array is a one-dimensional detector array comprising a plurality of detector subelements (962-967, i.e. photodetectors) each having a width of from about 1/2 to about 5 blur diameters (1 blur diameter is equivalent to from approximately the area of a single detector to approximately 1/2 the area of 3 adjacent detectors according to col. 10, lines 12-18), and a length of n blur diameters (n is approximately equal to the width of the detector if detector is approximately square), wherein each detector subelement overlaps each of two adjacent detector subelements along their lengths, wherein an overlap of each of the two adjacent detector subelements is m blur diameters (shifted alternatively by a distance (D) and (D) is in general, preferably 1/2 size of a photodetector, col. 9, lines 59-60) and a center-to-center spacing of each of the two adjacent detector subelements is n_0 blur diameters (or $2D$), and wherein n is equal to about $3m$ and m is equal to about $n_0/2$ (col. 9, lines 59-60 implies that a tolerance of plus or minus D may fall within these measurements). Hou does not explicitly disclose that the optics system that images a point feature of a scene at an image plane as a blur-circle image having a blur diameter. Coufal discloses that the optics system that images a point feature of a scene at an image plane as a

blur-circle image having a blur diameter based on its optics system (paragraph 0089, lines 1-4). It would have been obvious to one skilled in the art to provide an optics system such as the one disclosed in Coufal to the device of Hou for the purpose of addressing the degree of imperfections of optical systems which lead to distortions of a scene imaged by an optical system.

Regarding claim 2, Hou discloses that the detector subelements each have a width of about 1 blur diameter (1 blur diameter corresponds to the area of a single detector to approximately 1/2 the area of 3 adjacent detectors according to col. 10, lines 12-18).

Regarding claim 3, Hou further discloses that n lies in a range of from about $(3m - 2)$ to about $(3m + 2)$, and m lies in a range of from about $(n_0/2 - 1)$ to from $(n_0/2 + 1)$ (according to claim 1, if D corresponds to m , and $3D$ corresponds to n , then both m and n fall within the recited ranges).

Regarding claim 4, Hou further discloses that n lies in a range of from $(3m - 2)$ to $(3m + 2)$, and m lies in a range of from $(n_0/2 - 1)$ to $(n_0/2 + 1)$ (according to claim 1, if D corresponds to m , and $3D$ corresponds to n , then both m and n fall within the recited ranges).

Regarding claim 11, Hou further discloses a scanning mechanism that scans the one-dimensional detector array in a scanning direction perpendicular to the length of the detector subelements (col. 5, lines 39-42).

Regarding claim 12, Hou further discloses a scanning mechanism that includes a moving platform upon which the one-dimensional detector array is mounted (col. 5, lines

39-42).

Regarding claim 13, Hou shows in Figs. 2A and 10, an imaging sensor system comprising an optics system (208, i.e., rod lens array) that images a point feature of a scene at an image plane having a blur diameter (960, 968, 970, i.e., scanning dots); and a detector array (250, photodetector array) at the image plane, wherein the detector array is a one dimensional detector array or a two-dimensional detector array comprising a plurality of detector subelements, and wherein the detector subelements are sized responsive to the blur diameter. Hou does not explicitly disclose that the optics system that images a point feature of a scene at an image plane as a blur-circle image having a blur diameter. Coufal discloses that the optics system that images a point feature of a scene at an image plane as a blur-circle image having a blur diameter based on its optics system (paragraph 0089, lines 1-4). It would have been obvious to one skilled in the art to provide an optics system such as the one disclosed in Coufal to the device of Hou for the purpose of addressing the degree of imperfections of optical systems which lead to distortions of a scene imaged by an optical system.

Regarding claim 14, Hou further shows in Fig. 10, the detector subelements are square in plan view.(col. 6, lines 39-40).

Regarding claim 15, Hou shows in Fig. 10, the detector subelements are rectangular in plan view (col. 6, lines 39-40).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-5, are rejected under 35 U.S.C. 103(a) as being unpatentable over Carnall, Jr. (U.S. Patent No. 5,065,245) in view of Hou (U.S. Patent No. 6,596,979 B2) and Coufal (Publication No. U.S. 2003/0053221 A1).

Regarding claim 1, Carnall, Jr. shows in Fig. 1 an imaging sensor system (10, i.e., modular image sensor array) a detector array at the image plane, wherein the detector array is a one-dimensional detector array comprising a plurality of detector subelements each having a width of from about 1/2 to about 5 blur diameters, and a length of n blur diameters, wherein each detector subelement overlaps each of two adjacent detector subelements along their lengths, wherein an overlap of each of the two adjacent detector subelements is m blur diameters and a center-to-center spacing of each of the two adjacent detector subelements is n_0 blur diameters, and wherein n is equal to about 3 m and m is equal to about $n_0/2$. Carnall, Jr. does not disclose an optics system that images a point feature of a scene at an image plane as a blur-circle image having a blur diameter. Hou shows in Fig. 2B, an optics system (208, optical lens 274) having a blur diameter (col. 5, lines 27-33), and Coufal discloses imaging a point feature of a scene at an image plane as a blur-circle image (due to inherent imperfections of its optics system, paragraph 0028, lines 1-4). It would have been obvious to one skilled in the art to provide the optics system of Hou and the teachings of Coufal to the device of Carnall, Jr. for the purpose of providing a reliable

means of focusing and aligning image onto the photodetector array taking into account the realized imperfections of the optics system.

Regarding claims 2-5, Carnall, Jr. further discloses the claimed invention as stated above. In addition, Carnall, Jr. shows in Fig. 1 a) subelements each have a width of about 1 blur diameter; b) n lies in a range of from about $(3m-2)$ to about $(3m+2)$, and m lies in a range of from about $(n_0/2-1)$ to about $(n_0/2+1)$; c) n lies in a range from $(3m-2)$ to $(3m+2)$, and m lies in a range of from $(n_0/2-1)$ to $(n_0/2+1)$; and d) n is equal to $3m$ and m is equal to $n_0/2$. Carnall, Jr. does not disclose an optics system that images a point feature of a scene at an image plane as a blur-circle image having a blur diameter. Hou shows in Fig. 2B, a) an optics system (208, optical lens 274) that images a point feature of a scene at an image plane as a blur-circle image having a blur diameter (col. 5, lines 27-33). It would have been obvious to one skilled in the art to provide the optics system of Hou to the device of Carnall, Jr. for the purpose of providing a reliable means of focusing and aligning image onto the photodetector array.

Allowable Subject Matter

6. Claims 6-10 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. The following is a statement of reasons for the indication of allowable subject matter:

Claim 6, is allowable because the prior art fails to disclose or make obvious,

either singly or in combination, an imaging sensor system, comprising, in addition to the other recited features of the claim, detector subelements having a length of at least 20 times the detector width, and wherein n is substantially equal to $3m$ and m is substantially equal to $n_0/2$.

Claim 7 is allowable because the prior art fails to disclose or make obvious, either singly or in combination, an imaging sensor system, comprising, in addition to the other recited features of the claim, detector subelements wherein n is substantially equal to $(3m-2)$ and m is substantially equal to $(n_0/2-1)$.

Claim 8 is allowable because the prior art fails to disclose or make obvious, either singly or in combination, an imaging sensor system, comprising, in addition to the other recited features of the claim, detector subelements having a length of less than 20 times the detector width, and wherein n is substantially equal to $(3m-2)$ and m is substantially equal to $(n_0/2-1)$.

Claim 9 is allowable because the prior art fails to disclose or make obvious, either singly or in combination, an imaging sensor system, comprising, in addition to the other recited features of the claim, detector subelements wherein n is substantially equal to $(3m+2)$ and m is substantially equal to $(n_0/2+1)$.

Claim 10 is allowable because the prior art fails to disclose or make obvious, either singly or in combination, an imaging sensor system, comprising, in addition to the other recited features of the claim, detector subelements having a length of less than 20 times the detector width, and wherein n is substantially equal to $(3m+2)$ and m is substantially equal to $(n_0/2+1)$.

Claim 16 is allowable because the prior art fails to disclose or make obvious, either singly or in combination, an imaging sensor system, comprising, in addition to the other recited features of the claim, detector subelements having a lengthwise overlap of 1 blur diameter relative to a laterally adjacent detector subelement.

Response to Arguments

8. Applicant's arguments filed 09/01/2006 have been fully considered but they are not persuasive.

In response to applicant's arguments regarding the Response to Arguments, page 9, lines 12-16, where the applicant "request that, if the rejection is maintained, the Examiner apply a statutory prior art reference," the examiner maintains that this aspect of the previous rejection is well known in the art. The examiner addresses the optics system in Hou and maintains that optics systems will provide a degree of imperfection when imaging an object due to tolerances optics system in the device and limitations of the lens material. Nevertheless, the examiner has provided evidence to fully support this assertion which is now addressed under U.S.C. 103(a).

In response to applicant's arguments regarding claims 1-4, that Hou discloses the overlap of adjacent photodetectors in terms of size of the detector and not in terms of blur diameter and that col. 9, lines 59-61 has no relation to a blur diameter of a point image on the detector, but instead is related only to the detector dimension, the examiner disagrees. Hou further discloses in col. 10, lines 15-18 that the scanning dot

corresponds to a group of three overlapping adjacent detectors.

In response to applicant's argument that hindsight reconstruction was somehow used to address claims 2-4, the examiner disagrees. As stated in examiner's previous Response to Arguments, Hou's disclosure in col. 9, lines 59-61 and col. 10, lines 13-18, appropriately addresses the limitations of these claims particularly due to the fact that the range of the sizes given for the detectors are very broad and the size of the blur diameters recited in these claims are approximated. Observing the features of Fig. 10, one can reasonably conclude that the scanning dots (960, 968 and 970) would reasonably fall within the 1/2 to 5 blur diameter range recited in claim 1.

In response to applicant's arguments that there is no mention of any sampling device or logic for determining whether exactly one or more than one of the adjacent detectors is producing an output signal, the examiner disagrees. Col. 5, lines 33-35 and 54-60 suggests that the photodetectors and their adjacent outputs are read out through multiplexer 308 which is controlled by register 312 and all photodetector signals are outputted through amplifier 300.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the teachings in

Hou related to the optics system (such as shown in Fig 2A) provides a means to modify or possibly enhance image detection in Carnall. This, teaching in Hou suggests that the combination of the two references would provide an improvement in Carnall.

In response to applicant's argument regarding claims 1-5, that the teachings of Hou cannot be combined with Carnall due to different geometries and analytical procedures taught by the two references, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Wyatt whose telephone number is (571)-272-5974. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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